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Textile Waste Fiber-Reinforced Mortar: performance evaluation

(apresentação oral/ oral presentation)

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Extended Abstract:

The increase of extraction and processing of natural resources is accompanied by the formation of significant amount of waste materials. Comparative studies on recycling and waste management options reveal significant environmental advantages of recycling over landfilling and incineration. Therefore, the cost, quality and availability of raw materials became of paramount importance and a significant number of companies are currently developing secondary manufacturing processes for their waste materials and by-products.

Among the industries producing wasting materials, textile industry produces large amounts of waste which are used with success in second-line products. Although the usage of waste fibers in the building construction industry is already a reality, namely in the production of thermal and acoustic insulation panels, their disposal in landfills is still a reality. An interesting application seems to be fiber-reinforced mortar mixtures for masonry applications, new or replacing existing mortars, which have not been extensively studied.

In this paper an experimental work is presented which main objective is the evaluation of the influence of different percentages of waste fibers (figure 1) usage on the performance of fiber-reinforced mortars. Mortars performance evaluation was carried out through flow table, dynamic modulus of elasticity, flexural and compressive strength, capillary absorption, drying index, open porosity; thermal conductivity and adherence tests.

From the research work carried out, one may conclude that when the percentage of waste fibrous material increases: is very difficult to obtain an homogeneous fiber dispersion; the flowability tends to be constant as well as the capillary absorption, drying index, open porosity; the dynamic modulus of elasticity decreases as well as the flexural and compressive strength; adherence strength and the thermal conductivity increases.

Keywords: fibers, solid waste, cement, mortar, mechanical/physical properties.

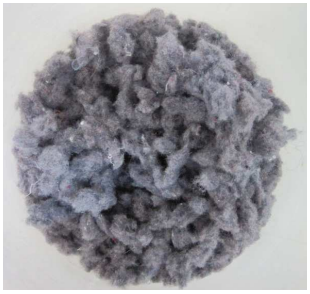

Figure 1 – Waste fibrous material

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